AD-A132 324 INDIRECT FIRE CASUALTY ASSESSMENT (IFCAS)(U) SCIENCE APPLICATIONS INC LA JOLLA CA W B DEGRAF 29 JUN 83 MDA903-83-C-0222 1/1

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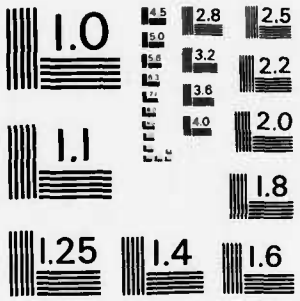

INDIRECT FIRE CASUALTY ASSESSMENT

(IFCAS)

29 June 1983

Sponsored by

Defense Advanced Research Projects Agency (DOD)
ARPA order No. 4739
Under Contract No. MDA903-83-C-0222 issued by
Department of Army, Defense Supply Service - Washington
Washington D.C. 20310

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This report was prepared by Science Applications for the Defense Advance Research Projects Agency under Contract no. MDA903-83-C-0222, Large Scale Simulation, which expires 30 September 1983. The SAI Project Manager for this project is Mr. William B. DeGraf, phone (703) 734-5972.

This report has been reviewed and approved for distribution.

Project Manager

Department Manager

FOREWORD

This document supplements the briefing on IFCAS provided to the LSS group on 29 June 1983. It contains the documentation on the IFCAS.

Section 1 of this document provides a functional capabilities summary of the Indirect Fire Casualty Assessment Processor. The processor itself is detailed in Section 2.0. Attachment A provides illustrations of Indirect Fire Casualty Assessment Processor Data Structures.

SECTION 1

CAPABILITIES SUMMARY

INDIRECT FIRE CASUALTY ASSESSMENT (IFCAS)

1.0 CAPABILITIES SUMMARY - INDIRECT FIRE CASUALTY ASSESSMENT (IFCAS)

Capabilities provided by the CIS software in support of indirect fire events shall include:

- o maintenance of a pre-planned target list,
- o maintenance of a list of groups of targets, and
- o maintenance/processing of indirect fire missions.

The following paragraphs present discussions of each of the above listed functions describing operator inputs, software processing and outputs provided by the system.

1.1 Pre-Planned Targets

The operator shall have the capability of defining a pre-planned target list which may contain a maximum of 1,000 pre-planned targets (i.e., 500 BLUEFOR targets and 500 OPFOR targets). For each pre-planned target, the operator shall specify FORCE, TARGET NUMBER and TARGET LOCATION as defined below.

Field	Valid Operator Input
FORCE	BLUEFOR OPFOR
TARGET NUMBER	5 character (alpha-numeric) designation.
TARGET LOCATION	UTM coordinate

The pre-planned target list shall be maintained in the system data base for use in defining fire missions (see discussion below). The operator shall have the capability to delete targets from the pre-planned target list at any time during real time exercise operations. Input and update of the pre-planned target list shall be accomplished through use of the INDIRECT FIRE interactive menu as presented in Figure 1.1.

The operator shall be provided the capability to request display of the pre-planned target list on the Support Display. Targets on the list shall be presented in either alphanumeric or location proximity order, as per operator specification. Each time the operator requests a display of the target list in location proximity order, he shall provide the UTM coordinate upon which the system shall base its list order. The target list display is detailed in Figure 1.2.

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
1	List	ACTION	DEFINE PRE-PLANNED TARGET DEFINE GROUP OF TARGETS DELETE TARGET/GROUP DEFINE FIRE MISSION DEFINE TARGET SERIES EXECUTE ON-CALL MISSION	Defines menu display options.
IF DEFINE PRE-PLANNED TARGET:				
2	List	FORCE	BLUEFOR OPFOR	
3	Alpha/ Numeric Entry	TARGET NUMBER	5 spaces to be filled in from Alpha/Numeric pad.	Specifies target number.
4	Alpha/ Numeric Entry	TARGET LOCATION	10 spaces to be filled in from Alpha/Numeric pad.	Specifies UTM coordinate of target.
5	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF DEFINE GROUP OF TARGETS:				
2	List	FORCE	BLUEFOR OPFOR	
3	Alpha/ Numeric Entry	GROUP DESIGNATION	3 spaces to be filled in from Alpha/Numeric pad.	Specifies designation for group of targets.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 1 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
4	List	TARGETS	List of targets previously defined and input to the system.	Specifies targets belonging to group.
5	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF DELETE TARGET/GROUP:				
2	List	FORCE	BLUEFOR OPFOR	
3	List	ACTION	DELETE TARGET DELETE GROUP	Defines menu display options.
IF DELETE TARGET:				
4	List	TARGETS	List of targets previously defined and input to the system.	Defines selection of targets to be deleted from the data base. Multiple selections allowed.
5	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 2 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF DELETE GROUP:				
4	List	GROUPS	List of groups of targets previously defined and input to the system.	Defines selection of groups of targets to be deleted from the data base. Multiple selections allowed.
5	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF DEFINE FIRE MISSION:				
2	List	FORCE	BLUEFOR OPFOR	
3	List	TYPE MISSION	SCHEDULED ON CALL IMMEDIATE	Defines menu display options.
IF SCHEDULED:				
4	List	ACTION	NEW SCHEDULED MISSION EDIT SCHEDULED MISSION CANCEL SCHEDULED MISSION	

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 3 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF NEW SCHEDULED MISSION:				
5	List	IDENTIFY TARGET	NEW TARGET EXISTING TARGET NEW GROUP OF TARGETS EXISTING GROUP OF TARGETS	
IF NEW TARGET:				
6	Alpha/ Numeric Entry	TARGET NUMBER	5 spaces to be filled in from Alpha/Numeric pad.	Specifies target number.
7	Alpha/ Numeric Entry	TARGET LOCATION	10 spaces to be filled in from Alpha/Numeric pad.	Specifies UTM coordinate of target.
8	List	FIRING UNIT	List of BLUFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute fire mission.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 4 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
9	List	WEAPON	FOR BLUEFOR: FOR OPFOR: 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.
10	List	SHELL	HE HERAP HC ILLUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
11	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)
12	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
FOR BLUEFOR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 5 OF 29)

DISPLAY GROUP	TYPE	EFFECT	CONTENT	DESCRIPTION
	13	List	SCHEDULE MISSION EXECUTION	TIME TARGET SERIES	Defines menu display options.
IF TIME:				
	14	Alpha/ Numeric Entry	TIME	DD MON YR __:__ (Current date displayed for edit (if required) followed by 4 spaces to be filled in with HH:MM values)	Specifies execution date and time of Fire Mission.
	15	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF TARGET SERIES:				
	14	List	SELECT SERIES	01 02 03 04 05 06 07 08 09 010	Specifies execution time is in accordance with particular target series.
	15	Alpha/ Numeric Entry	OFFSET TIME	3 spaces to be filled in from Alpha/Numeric pad.	Specifies target series offset time for mission (± up to 59 minutes).
	16	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 6 OF 29

DISPLAY GROUP	TYPE	FIELD	CONTENT	DESCRIPTION
IF EXISTING TARGET:				
6	List	PRE-PLANNED TARGET	List of targets previously defined and input to the system.	Defines selection of target. NOTE: Upon selection of target, all parameters describing the target are displayed for review.
7	List	FIRING UNIT	List of BLUFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.
8	List	WEAPON	FOR BLUFOR: 105-mm 107-mm 155-mm 175-mm 8" FOR OPFOR: 122-mm HOWITZER 152-mm HOWITZER 152-mm GUN/HOWITZER	Defines selection of weapon to be fired.
9	List	SHELL	HE HERAP HC FLUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
10	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)

FIGURE I.1 MENU: INDIRECT FIRE (PAGE 7 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
11	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
FOR BLOEFOR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)
13	List	SCHEDULE MISSION EXECUTION	TIME TARGET SERIES	Defines menu display options.
IF TIME:				
14	Alpha/ Numeric Entry	TIME	DD MON YR __:__ (current date displayed for edit (if required) followed by 4 spaces to be filled in with HH:MM values)	Specifies execution date and time of Fire Mission.
15	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 8 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF TARGET SERIES:				
14	List	SELECT SERIES	111 112 113 114 115 116 117 118 119 1110	Specifies execution time is in accordance with particular target series.
15	Alpha/ Numeric Entry	OFFSET TIME	3 spaces to be filled in from Alpha/Numeric pad.	Specifies target series offset time for mission (0 up to 59 (minutes).
16	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF NEW GROUP OF TARGETS:				
6	Alpha/ Numeric Entry	GROUP DESIGNATION	3 spaces to be filled in from Alpha/Numeric pad.	Specifies designation for group of targets.
7	List	TARGETS	List of targets previously defined and input to the system.	Specifies targets belonging to group.
8	List	FIRING UNIT	List of BLUEFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 9 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
9	List	WEAPON	FOR BLUEFOR: 105-mm 107-mm 155-mm 175-mm 8" FOR OPFOR: 122-mm HOWITZER 152-mm HOWITZER 152-mm GUN/HOWITZER	Defines selection of weapon to be fired.
10	List	SHELL	HE HERAP HC ILLUM WP ICM DPICM TASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
11	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)
12	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
*FOR BLUEFOR 155-mm ONLY:	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 10 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
13.	List	SCHEDULE MISSION EXECUTION	TIME TARGET SERIES	Defines menu display options.
IF TIME:				
14	Alpha/ Numeric Entry	TIME	DD MON YR __:__ (current date displayed for edit (if required) followed by 4 spaces to be filled in with HH:MM values)	Specifies execution date and time of Fire Mission.
15	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF TARGET SERIES:				
14	List	SELECT SERIES	H1 H2 H3 H4 H5 H6 H7 H8 H9 H10	Specifies execution time is in accordance with particular target series.
15	Alpha/ Numeric Entry	OFFSET TIME	3 spaces to be filled in from Alpha/Numeric pad.	Specifies target series offset time for missinn (1 up to 59 minutes).
16	List	----	IGNORE REPLAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 11 OF 29

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF EXISTING GROUP OF TARGETS:				
6	List	GROUP OF TARGETS	List of Groups of Targets previously defined and input to the system.	Defines selection of Group of Targets. NOTE: Upon selection of Group of Targets, all parameters describing the Group are displayed for review.
7	List	FIRING UNIT	List of BLUEFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.
8	List	WEAPON	*For BLUEFOR:* *FOR OPFOR:* 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.
9	List	SHELL	HE DERAP HC ILLUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
10	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 12 OF 29

DISPLAY GROUP	TYPE	FIELD	CONTENT	DESCRIPTION
11	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
FOR HOWITZER 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)
12	List	SCHEDULE MISSION EXECUTION	TIME TARGET SERIES	Defines menu display options.
IF TIME:				
13	Alpha/ Numeric Entry	TIME	DD MON YR __:__ (current date displayed for edit (if required) followed by 4 spaces to be filled in with HH:MM values)	Specifies execution date and time of Fire Mission.
14	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 13 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF TARGET SERIES:				
13	List	SELECT SERIES	111 112 113 114 115 116 117 118 119 1110	Specifies execution time is in accordance with particular target series.
14	Alpha/ Numeric Entry	OFFSET TIME	3 spaces to be filled in from Alpha/Numeric pad.	Specifies target series offset time for mission (± up to 59 minutes).
15	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF EDIT SCHEDULED MISSION:				
5	List	FIRE MISSION	List of scheduled fire missions previously defined and input to the system.	Defines selection of fire mission data to be updated/ modified. NOTE: Upon selection of fire mission, all parameters describing the fire mission are displayed for review.
6	List	SELECT PARAMETER FOR EDIT	List of fire mission parameters which are available for edit.	Allows operator to update/ modify fire mission entries.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 14 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
7	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF CANCEL SCHEDULED MISSION:				
5	List	FIRE MISSION	List of scheduled fire missions previously defined and input to the system.	Defines selection of fire mission to be cancelled.
6	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF ON-CALL:				
4	List	ACTION	NEW ON-CALL MISSION EDIT ON-CALL MISSION CANCEL ON-CALL MISSION	Defines menu display options.
IF NEW ON-CALL MISSION:				
5	List	IDENTIFY TARGET	NEW TARGET EXISTING TARGET NEW GROUP OF TARGETS EXISTING GROUP OF TARGETS	Defines menu display options.
IF NEW TARGET:				
6	Alpha/ Numeric Entry	TARGET NUMBER	5 spaces to be filled in from Alpha/Numeric pad.	Specifies target number.
7	Alpha/ Numeric Entry	TARGET LOCATION	10 spaces to be filled in from Alpha/Numeric pad.	Specifies UTM coordinate of target.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 15 OF 29

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
8	List	FIRING UNIT	List of BLUFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.
9	List	WEAPON	For BLUFOR: FOR OPFOR: 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.
10	List	SHELL	HE HERAP HC ILLUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
11	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)
12	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: PD)

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 16 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
FOR BLUEFOR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)
13	List	----	IGNORE REPLAT DONE	Specifies manner of entry completion.
IF EXISTING TARGET:				
6	List	PRE-PLANNED TARGET	List of targets previously defined and input to the system.	Defines selection of target. NOTE: Upon selection of target, all parameters describing the target are displayed for review.
7	List	FIRING UNIT	List of BLUEFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.
8	List	WEAPON	For BLUEFOR: For OPFOR: 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 17 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
9	List	SHELL	HE HERAP HC ILLUM WP ICM DPICM RASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
10	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)
11	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
FOR BLUEFOR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)
12	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 18 OF 29

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF NEW GROUP OF TARGETS:				
6	Alpha/ Numeric Entry	GROUP DESIGNATION	3 spaces to be filled in from Alpha/Numeric pad.	Specifies designation for group of targets.
7	List	TARGETS	List of targets previously defined and input to the system.	Specifies targets belonging to group.
8	List	FIRING UNIT	List of BLUEFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.
9	List	WEAPON	For BLUEFOR: For OPFOR: 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.
10	List	SHELL	HE HERAP HC HELUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
11	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 19 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
12	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
FOR BLUEFOR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)
13	List	--	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF EXISTING GROUP OF TARGETS:				
6	List	GROUP OF TARGETS	List of Groups of Targets previously defined and input to the system.	Defines selection of Group of Targets. NOTE: Upon selection of Group of Targets, all parameters describing the Group are displayed for review.
7	List	FIRING UNIT	List of BLUEFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 20 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
8	List	WEAPON	for BLUEFOR: for OPFOR: 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.
9	List	SHELL	HE HERAP HC ILLUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
10	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)
11	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 21 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
FOR M109E1OR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)
12	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF EDIT ON-CALL MISSION:				
5	List	FIRE MISSION	List of on-call fire missions previously defined and input to the system.	Defines selection of fire mission data to be updated/ modified. NOTE: Upon selection of fire mission, all parameters describing the fire mission are displayed for review.
6	List	SELECT PARAMETER FOR EDIT	List of fire mission parameters which are available for edit.	Allows operator to update/ modify fire mission entries.
7	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF CANCEL ON-CALL MISSION:				
5	List	FIRE MISSION	List of on-call fire missions previously defined and input to the system.	Defines selection of fire mission to be cancelled.
6	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 22 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF IMMEDIATE:				
4	List	IDENTIFY TARGET	NEW TARGET EXISTING TARGET	Defines menu display options.
IF NEW TARGET:				
5	Alpha/ Numeric Entry	TARGET NUMBER	5 spaces to be filled in from Alpha/Numeric pad.	Specifies target number. Input is optional.
6	Alpha/ Numeric Entry	TARGET LOCATION	10 spaces to be filled in from Alpha/Numeric pad.	Specifies UTM coordinate of target.
7	List	FIRING UNIT	List of BLUFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.
8	List	WEAPON	For BLUFOR: For OPFOR: 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.
9	List	SHELL	HE MERAP HC ILLUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 23 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
10	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)
11	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
FOR BLUEFOR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)
12	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF EXISTING TARGET:				
5	List	PRE-PLANNED TARGET	List of targets previously defined and input to the system.	Defines selection of target. NOTE: Upon selection of target, all parameters describing the target are displayed for review.
6	List	FIRING UNIT	List of BLUEFOR or OPFOR firing units identified in system data base.	Defines selection of unit to execute Fire Mission.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 24 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
7	List	WEAPON	For BLUEFOR: For OPFOR: 105-mm 122-mm HOWITZER 107-mm 152-mm HOWITZER 155-mm 152-mm GUN/HOWITZER 175-mm 8"	Defines selection of weapon to be fired.
8	List	SHELL	HE HERAP HC ILLUM WP ICM DPICM FASCAM CLGP	Defines selection of shell to be used. Input is optional. (Default: HE)
9	List	FUSE	PD DELAY VT	Specifies selection of fuse to be used. Input is optional. (Default: PD)
10	List	ROUNDS	BTRY 1 BN 1 BTRY 2 BN 2 BTRY 3 BN 3 BTRY 4 BN 4 BTRY 5 BN 5 BTRY 6 BN 6 BTRY 7 BN 7 BTRY 8 BN 8 BTRY 9 BN 9 BTRY 10 BN 10	Specifies number of rounds to be delivered. Input is optional. (Default: BTRY 1)
FOR BLUEFOR 155-mm ONLY:				
	List	CHARGE	CHARGE 7 CHARGE 8	Specifies firing charge to be used. Input is optional. (Default: CHARGE 7)

FIGURE I.1 MENU: INDIRECT FIRE (PAGE 25 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
11	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF DEFINE TARGET SERIES:				
2	List	FORCE	BLUEFOR OPFOR	
3	List	ACTION	NEW TARGET SERIES EDIT TARGET SERIES CANCEL TARGET SERIES	Defines menu display options.
IF NEW TARGET SERIES:				
4	List	SELECT SERIES	101 102 103 104 105 106 107 108 109 110	Specifies target series to be executed in accordance with operator input TIME.
5	Alpha/ Numeric Entry	TIME	DD MON YR __:__ (current date displayed for edit (if required) followed by 4 spaces to be filled in with HH:MM values)	Specifies execution date and time for target series.
6	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 26 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF EDIT TARGET SERIES:				
4	List	SELECT SERIES	01 02 03 04 05 06 07 08 09 010	Specifies target series for which TIME shall be updated. Upon selection of targe series, the previously entered date and time are displayed for review/ update.
5	Alpha/ Numeric Entry	UPDATE TIME	Previously entered date and time.	Allows operator to update date/time of execution for target series.
6	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF CANCEL TARGET SERIES:				
4	List	SELECT SERIES	01 02 03 04 05 06 07 08 09 010	Defines selection of target series to be cancelled.
5	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 27 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
IF EXECUTE ON-CALL MISSION:				
2	List	FORCE	BLUEFOR OPFOR	Defines menu display options.
3	List	ON CALL MISSIONS	List of on-call fire missions identified in system data base.	Defines selection of on-call fire mission to be executed.
4	List	SCHEDULE MISSION EXECUTION	TIME TARGET SERIES	Defines menu display options.
IF TIME:				
5	Alpha/ Numeric *Entry*	TIME	DD MON YR __:__ (current date displayed for edit (if required) followed by 4 spaces to be filled in with HH:MM values)	Specifies execution date and time of Fire Mission.
6	List	---	IGNORE REPEAT DONE	Specifies manner of entry completion.
IF TARGET SERIES:				
9	List	SELECT SERIES	101 102 103 104 105 106 107 108 109 1010	Specifies execution time is in accordance with particular target series.

FIGURE 1.1 MENU: INDIRECT FIRE (PAGE 28 OF 29)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
6	Alpha/ Numeric Entry	OFFSET TIME	3 spaces to be filled in from Alpha/Numeric pad.	Specifies target series offset time for mission (0 up to 59 minutes).
7	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE I.1 MENU: INDIRECT FIRE (PAGE 29 OF 29)

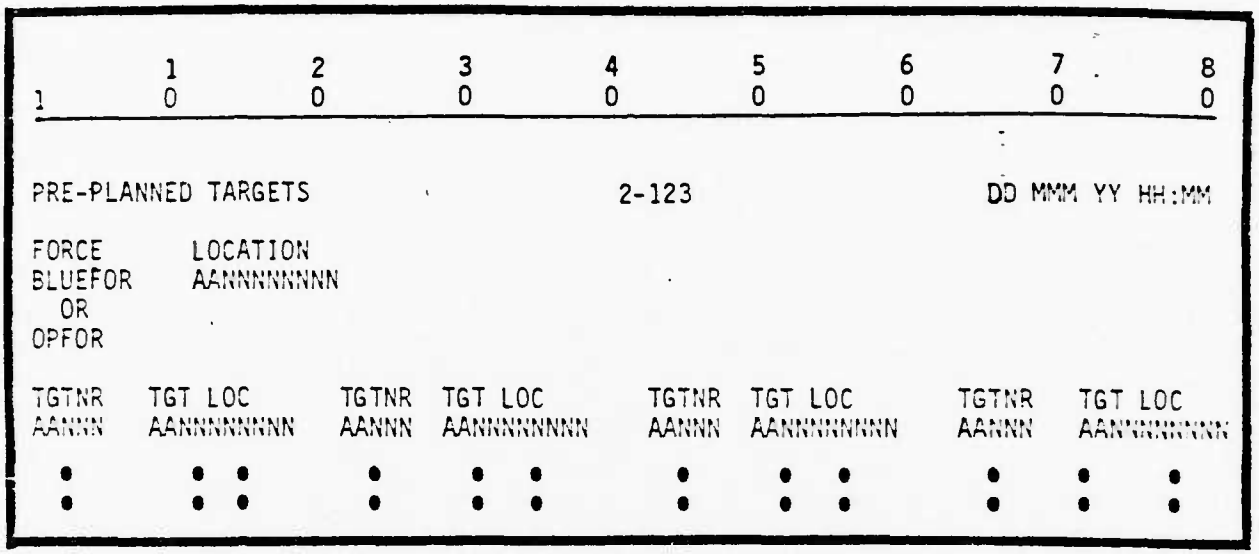


FIGURE 1.2 PRE-PLANNED TARGETS (PAGE 1 OF 2)

TITLE: Pre-Planned Targets

DISPLAY TYPE: Tabular

CONTENT:

Column Heading	Description
FORCE	Force for which target list is requested.
LOCATION	If target list is requested for display in location proximity order, the UTM coordinate specified by the operator for use in the ordering sequence of the list.
TGTNR	Target number of target.
TGT LOC	UTM coordinate of target.

DISPLAY CRITERIA:

TIME	The display shall contain a list of all BLUEFOR or OPFOR targets identified in the system data base at an operator specified exercise time or, as a default, to the exercise time as displayed on the Tactical Display at the time of the display request. NOTE: The operator specified time must be a time which is included in the current exercise segment.
FORCE	The operator specifies whether the display is for BLUEFOR or OPFOR.
SEQUENCE	The operator specifies the sequencing order in which the target list is to be presented (i.e., either alphanumeric or location proximity order). If the display is to be provided in location proximity order, the operator specifies the UTM coordinate upon which the list sequencing order shall be based.

FIGURE 1.2 PRE-PLANNED TARGETS (PAGE 2 OF 2)

1.2 Groups Of Targets

The operator shall have the capability of identifying up to 50 groups of targets with each group consisting of up to 10 targets selected from targets on the pre-planned target list. For each group of targets, the operator shall specify FORCE, GROUP DESIGNATION, and TARGETS belonging to the group as defined below.

Field	Valid Operator Input
FORCE	BLUEFOR OPFOR
GROUP DESIGNATION	3 character (alpha-numeric) designation.
TARGETS	Up to 10 targets selected from pre-planned target list.

Groups of targets shall be maintained in the system data base for use in defining fire missions (see discussion below). The operator shall have the capability to delete groups of targets from the data base at any time during real time exercise operations. Input and update of the list of groups of targets shall be accomplished through the INDIRECT FIRE interactive menu (Figure 1.1).

The operator shall be provided the capability to request display of the list of groups of targets maintained in the system data base on the Support Display. The display is detailed in Figure 1.3.

1.3 Fire Mission Items

Up to 500 fire missions may be input by the operator as 'active' (i.e., not yet executed) missions. Active missions shall include SCHEDULED, ON-CALL, and IMMEDIATE missions. Fire mission data input shall be accomplished through use of the INDIRECT FIRE interactive menu (Figure 1.1).

For each SCHEDULED mission, the operator shall specify FORCE, TARGET, FIRING UNIT, WEAPON, SHELL, FUSE, # ROUNDS, and MISSION EXECUTION TIME as defined below.

Field	Valid Operator Input
FORCE	BLUEFOR OPFOR
TARGET	New target, new group of targets or target

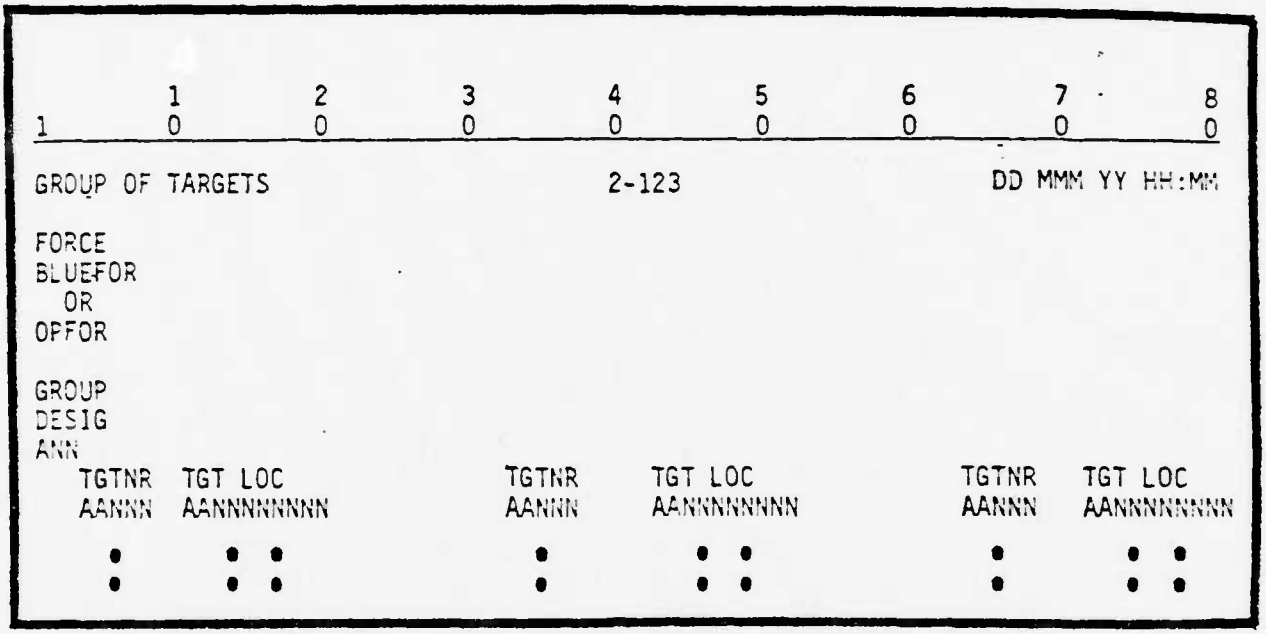


FIGURE 1.3 GROUPS OF TARGETS (PAGE 1 OF 2)

TITLE: Groups of Targets

DISPLAY TYPE: Tabular

CONTENT:

Column Heading	Description
FORCE	Force for which list is requested.
GROUP DESIG	Group designation for group of targets.
TGTNR	Target number of target(s) belonging to group.
TGT LOC	UTM coordinate(s) of targets belonging to group.

DISPLAY CRITERIA:

TIME	The display shall contain a list of all BLUEFOR or OPFOR groups of targets identified in the system data base at an operator specified exercise time, or as a default, to the exercise time as displayed on the Tactical Display at the time of the display request. NOTE: The operator specified time must be a time which is included in the current exercise segment.
FORCE	The operator specifies whether the display is for OPFOR or BLUEFOR. The display items are alphanumerically ordered in accordance with the group designations. The target number and location for each target belonging to a group of targets are presented in a list format beneath the associated group designation.

FIGURE 1.3 GROUPS OF TARGETS (PAGE 2 OF 2)

	or group of targets selected from pre-planned target list. Note: If a new target or new group of targets is specified, that target or group shall be automatically added to the pre-planned target/ group list maintained in the system data base.
FIRING UNIT	Selection of firing unit identified in system data base.
WEAPON	BLUEFOR: 105-mm, 107-mm, 155-mm, 175-mm, 8" OPFOR: 122-mm Howitzer, 152-mm Howitzer, 152-mm Gun/Howitzer
SHELL	HE, HERAP, HC, ILLUM, WP, ICM, DPICM, FASCAM, CLGP
FUSE	PD DELAY VT
# ROUNDS	BTRY 1 BN 1 . . . . . . BTRY 10 BN 10
TIME	Date/Time or H1 H2 .. ± up to 59 minutes .. (see discussion of H10 Target Series)

In addition, the operator shall identify the charge (CHARGE 7 or 8) to be used for each mission using the BLUEFOR 155-mm weapon.

SCHEDULED missions may be cancelled at any point up until 60 seconds prior to the operator specified execution time. In addition, the operator shall have the capability to modify/update fire mission data fields (e.g., WEAPON, SHELL, etc.) at any time up until 60 seconds prior to mission execution.

For each SCHEDULED mission, the system shall perform a range check on the firer to impact point five minutes prior to mission execution time (as permitted in accordance with time of mission data input). In the event the firing unit is found to be out of range of its target, an alert which shall identify the mission and its scheduled execution time shall be output for operator action.

Valid ranges for each of the BLUEFOR and OPFOR weapon types shall be as follows:

Weapon	Maximum Effective Range (Meters)
105-mm (M101A1)	11,000
107-mm (M30)	5,650
155-mm (M109A1)	14,800 (CHARGE 7)
	18,100 (CHARGE 8)
175-mm (M107)	32,800
8" (M110A1)	20,600
122-mm HOW (D-30)	15,300
152-mm HOW (D-1)	12,400
152-mm GUN/HOW (D-20)	18,500

In the event a SCHEDULED mission is determined to be out of range 5 minutes prior to its scheduled execution time, the system shall recheck that range 60 seconds prior to execution time and, if at that point the firing unit is found to be out of range of its target, than a second alert shall be output and no casualty assessment or indirect firing vector shall be provided.

For all missions determined to be within valid range, and using SHELL types HE, HERAP, WP, ICM and DPICM, the software shall perform casualty assessment and provide an alert which shall identify the mission, its scheduled execution time, recommended instrumented casualties, recommended uninstrumented personnel casualties (standing, prone, and in foxhole), and recommended uninstrumented vehicle casualties (tanks, APCs, and wheeled vehicles). The IFCAS alert shall be displayed 30 seconds prior to scheduled mission execution time and shall be formatted as follows:

[Time] : [Firing Unit] : [Weapon] : [Shell/Fz] : [Tgt#/Coord] : [Time of Execution]
INSTRUMENTED KILLS : [Player ID]; [Player ID] . . .
UNINSTRUMENTED PERS CAS : STAND [NN%] PROT [NN%]
UNINSTRUMENTED VEH CAS : TNK [NN%] APC [NN%] WHEEL [NN%]

e.g.,
10:24:30 : A/4-37 : 155MM : ILLUM/PD : AJ002/NJ34566139 : 10:25:00
INSTRUMENTED KILLS : BTNK:A05;BTOW:A03
UNINSTRUMENTED PERS CAS : STAND 5% PRONE 0% PROT 0%
UNINSTRUMENTED VEH CAS : TNK 0% APC 3% WHEEL 5%

For all missions determined to be within valid range and using SHELL types HC, ILLUM, FASCAM or CLGP, no casualty assessment shall be performed, but an alert identifying the mission and its scheduled execution time shall be provided 30 seconds prior to scheduled mission execution.

An indirect firing vector shall be displayed at mission execution time for ALL missions determined to be within valid range. The vector shall originate from the location of the firing unit with the weapon effects area represented by a rectangle centered on the impact point. The target number shall be displayed in the rectangle. (Note: In the event a target number is not provided for an IMMEDIATE mission, then the UTM coordinate of the impact point shall be displayed in the rectangle.) The symbol shall be displayed in the color of the firer. Mortar fire shall be displayed as a dashed rectangle rather than the solid lined rectangle used for artillery. Smoke missions shall be displayed as a dotted rectangle. Indirect fire symbols shall be displayed for 30 seconds.

For each ON-CALL or IMMEDIATE mission, the operator shall specify FORCE, TARGET, FIRING UNIT, WEAPON, SHELL, FUSE, # ROUNDS, and CHARGE (as applicable). NOTE: For an IMMEDIATE mission, the operator shall have the option of identifying the target by impact point only, rather than by target number and impact point as shall be required for all SCHEDULED and ON-CALL missions.

The ON-CALL mission shall remain in an ON-CALL status until it is either cancelled or assigned an execution time (in which case it becomes an active SCHEDULED mission).

The execution time for the IMMEDIATE mission is automatically set by software. Range checks, casualty assessments, and firing vector display processing for IMMEDIATE missions shall be essentially as described above for the SCHEDULED mission with the only difference being the timing of the processing. Specifically, the range check shall be performed immediately following mission data input and, in the event the firing unit to target range is found to be valid, then casualty assessment is immediately performed (as applicable), an alert is output, and the mission is 'executed' 30 seconds after output of the alert. Again, an indirect firing vector shall be displayed at mission execution time. For an out of range mission, no casualty assessment is performed, but rather an alert is output stating the mission is out of range.

In addition, any time a target number is not specified for an IMMEDIATE mission, the system shall check to see if any target in the pre-planned target list is within 500 meters of the impact point specified for the mission and shall include its findings (if any) in the FIRE SUPPORT LOG entry for that mission.

Once a mission is executed, it shall be assigned an "EXECUTED" status awaiting operator input of fire mission results. At this point, the operator shall use the FIRE MISSION RESULT interactive menu (Figure 1.4) to specify mission effects. Mission effects may be identified as being either NULL or POSITIVE. POSITIVE effects shall be defined as INSTRUMENTED and UNINSTRUMENTED casualties as defined below.

Field	Valid Operator Input
INSTRUMENTED CASUALTIES	Selection of casualties resulting from controller gun firing events.
UNINSTRUMENTED CASUALTIES:	
TANK	# lost
APC	..
CARR,MORT	..
CARR,CP	..
AD,MANPAD	..
AD(T)	..
AD(SP)	..
ARTY(T)	..
ARTY(SP)	..
TRK,LT	..
TRK,MED	..
TRK,HVY	..
WPN,AT	..
WPN,AUTO	..
PERSONNEL	#WIA
	#KIA

Missions for which results have been entered shall become FIRE MISSION LOG items. Up to 1600 executed missions may be included in the FIRE MISSION LOG over the 14 day exercise. Within the log, missions shall be ordered by execution time. The FIRE MISSION LOG is detailed in Figure 1.5.

1.4 Target Series

Target Series may be established through use of variables H1-H10 offset by ± up to 59 minutes. As previously noted in this discussion, the execution time for a SCHEDULED mission may be set as H(N)± up to 59 minutes. Having defined a Target Series in the data base, the operator may at any point set the value (time) of H(N). Once a Target Series time is defined, the system shall process all affected missions accordingly. In addition, the operator shall have the capability to modify/update the time entered for

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
1	List	FORCE	BLUEFOR OPFOR	Defines menu display options.
2	List	EFFECT	NULL POSITIVE	Defines selection of result of fire mission.
IF NULL:				
3	List	FIRED MISSIONS	List of fired missions	Defines selection of fire mission with no effects.
4	List	----	IGNORE REPEAT DONE	Defines manner of entry completion.
IF POSITIVE:				
3	List	FIRED MISSIONS	List of fired missions	Defines selection of fire mission for which effects are to be entered.
4	List	INSTRUMENTED CASUALTIES	List of instrumented casualties resulting from controller gun firing events.	Defines selection of instrumented casualties to be attributed to the mission.
5	List	UNINSTRUMENTED VEHICLE CASUALTIES	TYPE / #LOST TANK -- APC -- CARR, MORT -- CARR, CP -- AD, MANPAD -- AD(T) -- AD(SP) -- ARTY(T) -- ARTY(SP) -- TRK, LT -- TRK, MED -- TRK, HVY -- WPN,AT -- WPN,AUTO --	Allows operator to specify type and number of vehicle casualties to be attributed to mission. Input is optional.

FIGURE 1.4 MENU: FIRE MISSION RESULT (PAGE 1 OF 2)

DISPLAY GROUP	TYPE	TITLE	CONTENT	DESCRIPTION
6	List	UNINSTRUMENTED PERSONNEL CASUALTIES	TYPE # WIA -- KIA --	Allows operator to specify number of personnel casualties to be attributed to mission. Input is optional.
7	List	----	IGNORE REPEAT DONE	Specifies manner of entry completion.

FIGURE 1.4 MENU: FIRE MISSION RESULT (PAGE 2 OF 2)

```
        1         2         3         4         5         6         7         8
1       0         0         0         0         0         0         0         0
```

FIRE SUPPORT LOG 2-123 DD MMM YY HH:MM - DD MMM YY HH:MM

TIME	TGTNR	TGT LOC	FIRING UNIT	SHELL/FUSE	ROUNDS
DD HH:MM	AANNN	AANNNNNNNN	XX/NN-NNN	AAAAAA/AA	NNN

EFFECT: WIA:NN KIA:NN (VEHICLE N)__ (VEHICLE N)__ (VEHICLE N)__ (VEHICLE N)__

INSTRUMENTED LOSS: PLAYER ID PLAYER ID PLAYER ID

FIGURE 1.5 FIRE SUPPORT LOG
(PAGE 1 OF 3)

TITLE: Fire Support Log

DISPLAY TYPE: Tabular

CONTENT:

Column Heading	Description
TIME	Time of mission execution.
TGTNR (IMMED)	Target number of target, "IMMED" if immediate mission with no target number assigned, or group designation if applicable.
TGT LOC	UTM grid location for mission effects/ delivery.
FIRING UNIT	Name designation of unit executing mission.
SHELL/FUSE	Type of shell/fuse combination used.
ROUNDS	Number of rounds of ammunition expended in firing.
EFFECT	Description of mission effects for uninstrumented personnel and vehicles (by type), and instrumented losses by player identification.

DISPLAY CRITERIA:

TIME

All data on fire support missions shall be displayed for the entire history at an operator specified time range or, as a default, since the beginning of the history to the exercise time as displayed on the Tactical Display at the time of the display request.

The fixed portion of this format occupies one line per entry with effects on subsequent lines, with uninstrumented losses followed by instrumented losses by ID, for as many lines as necessary.

In the event an immediate mission is input by the operator with no target number and the system determines that there is a target(s) on the pre-planned target list which is

FIGURE 1.5 FIRE SUPPORT LOG

	within 500 meters of the impact point specified for the immediate mission, an additional line shall appear in the log entry for that mission as follows: TARGET(s) WITHIN 500 METERS: AANNN. NOTE: Maximum number of targets included in this line shall be 10.
	In the event a mission is out of range and therefore not "executed", MISSION OUT OF RANGE shall appear as the mission effect.
FORCE	The operator specifies whether the display is for the BLUEFOR or OPFOR Fire Support Log.

FIGURE 1.5 FIRE SUPPORT LOG
(PAGE 3 of 3)

Target Series or cancel a Target Series (thereby causing all missions belonging to the Target Series to be deleted from the active mission file). The capability to define and update a Target Series shall be provided in the INDIRECT FIRE interactive menu (Figure 1.1).

SECTION 2

INDIRECT FIRE AND CASUALTY ASSESSMENT PROCESSOR

(IFCASS)

2.0 INDIRECT FIRE AND CASUALTY ASSESSMENT PROCESSOR (IFCASS)

2.1 Module Synopsis

The IFCASS subprogram will monitor the IFCAS data structures updated by IDCHAN. It will look at each fire mission item and determine whether it is time for the mission to be executed. Upon execution, a casualty recommendation is sent to the IDC for processing by a military controller. IFCASS will provide out of range alerts for those missions whose firing unit is out of range of the designated targets.

2.2 Routine-level Synopsis

Program Description

IFCASS assesses the casualties of simulated fire missions. It is activated every ten seconds and, when activated, scans the Fire Mission Table seeking missions that are:

1. within 300 seconds of execution,
2. within 60 seconds of execution,
3. within 30 seconds of execution.

If a mission is within 300 seconds of execution or if the mission is within 60 seconds of execution, range alerts are sent when the target(s) of the mission are out-of-range. If a mission is within 30 seconds of execution, IFCASS will again send range alerts for out-of-range target(s). This time, though, processing will be done if all targets are in range. This processing includes casualty assessments and message formatting. Results include:

1. IDC-to-CC IFCAS messages,
2. updated IFCAS arrays in shared memory.

IFCASS is comprised of the following routines:

- IFCASS - Root
- IFCONT - Checks system status

- IFDIST - Finds distances
- IFDNGG - Sends disengagement messages
- IFENGG - Sends engagement messages
- IFFLNK - Gets value of link field in Fire Mission Table
- IFHLIS - Inserts items in history list
- IFINCL - Inserts items in circular list
- IFINIT - Initializes operating environment
- IFL300 - Deals with missions 300 seconds from execution
- IFLE30 - Deals with missions 30 seconds from execution
- IFLE60 - Deals with missions 60 seconds from execution
- IFLKUP - Finds indices into Weapon Effects Table
- IFPROC - Main processing subroutine
- IFQIDH - Queues items to the CC (IDCHAN)
- IFRECO - Produces casualty recommendatons
- IFTYPE - Finds player type
- IFWEAP - Initializes Weapon Effects Table

The IFCASS hierarchy chart is illustrated in Figure 2.1.

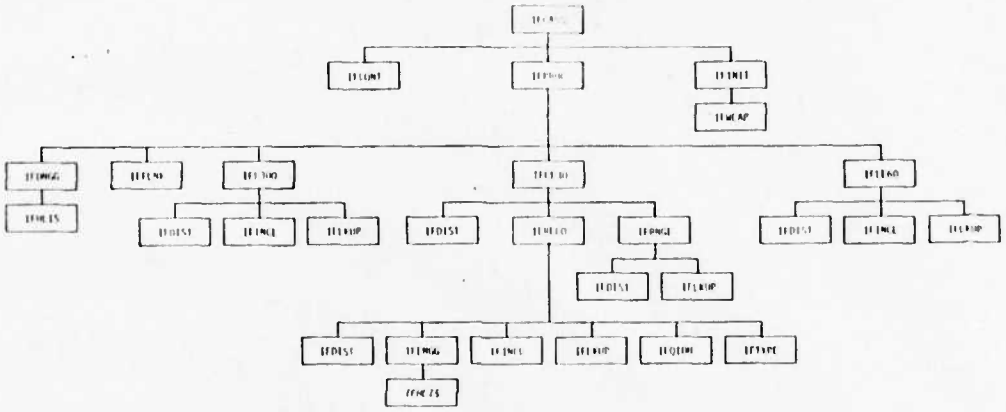


FIGURE 2.1 IFCASS HIERARCHY CHART

2.2.1 PROGRAM IFCASS -

"IFCASS" assesses casualities of indirect fire.

2.2.1.1 Input -

Input includes information from the Weapon Effects Table, Fire Mission Table, Target Group Table, and the Preplanned Target Table.

2.2.1.2 Process -

IFCASS produces a casualty recommendation based on the range of target, maximum range of weapon, and other considerations. In addition, IFCASS (1) alters the status of items in the Fire Mission Table, (2) produces range alert messages based on the time of execution of a Fire Mission and the range of the target, and (3) puts targets into the Nearest Target Table.

2.2.1.3 Output -

Output includes the IFCAS casualty message, range alerts, and entries in the Nearest Target Table.

2.2.2 LOGICAL*4 FUNCTION IFCONT -

"IFCONT" checks the CC global system status for IFCASS.

2.2.2.1 Input -

Input includes the value of the global system status flag.

2.2.2.2 Process -

"IFCONT" checks the global termination flag.

2.2.2.3 Output -

Output includes the logical flag indicating global system state.

2.2.3 INTEGER*4 FUNCTION IFDIST -

"IFDIST" computes the distance between two points.

2.2.3.1 Input -

Input includes the coordinates of the two points in pixemeters.

2.2.3.2 Process -

The Pythagorean Theorem is used to compute a distance.

2.2.3.3 Output -

Output includes the distance between the two points in meters.

2.2.4 SUBROUTINE IFDNGG -

"IFDNGG" sends disengagement messages to FRMTR.

2.2.4.1 Input -

There are no inputs to this routine.

2.2.4.2 Process -

Whenever it finds a 30-second old entry in the Engagement Table, "IFDNGG" formats a disengagement message and sends it to FRMTR. After doing so, this subroutine zeros the Engagement Table entry and updates the "next-available slot" pointer.

2.2.4.3 Output -

Output includes the disengagement messages.

2.2.5 SUBROUTINE IFENGG -

"IFENGG" sends engagement and disengagement messages to FRMTR.

2.2.5.1 Input -

Input includes (1) the address of an entry in the Fire Mission Table, and (2) the target coordinates.

2.2.5.2 Process -

"IFENGG" builds an engagement message and sends it to FRMTR. Then, it puts an entry into a local copy of the Engagement Table. If the table is full when an entry is to be added, then (1) the oldest entry in the table will be removed, and (2) a disengagement message corresponding to the entry will be sent.

2.2.5.3 Output -

Output includes (1) the entries added to the local Engagement Table, and (2) the engagement and disengagement messages.

2.2.6 INTEGER*4 FUNCTION IFFLNK -

"IFFLNK" gets the value of the Fire Mission Table link field (node).

2.2.6.1 Input -

Input includes the address of the Fire Mission Table entry.

2.2.6.2 Process -

"IFFLNK" gets the link field value of the Fire Mission item.

2.2.6.3 Output -

Output includes the value of link field.

2.2.7 SUBROUTINE IFHLIS -

"IFHLIS" puts an engagement or disengagement message into the history list.

2.2.7.1 Input -

Input includes the message buffer.

2.2.7.2 Process -

"IFHLIS" inserts a message into the history list, starting at the "next-available word". Then, FRMTR is dispatched to do additional processing.

2.2.7.3 Output -

A message will be output to the history list.

2.2.8 SUBROUTINE IFINCL -

"IFINCL" inserts a message into the CC Intermediate List.

2.2.8.1 Input -

Input includes both the message buffer and the message length.

2.2.8.2 Process -

"IFINCL" performs all indexing and fill operations required to move the message words into the next-available slot (which doesn't cross a block boundary) in the CC Intermediate List.

2.2.8.3 Output -

Output includes the message and filler words in the CC Intermediate List.

2.2.9 SUBROUTINE IFINIT -

"IFINIT" is the initialization routine for IFCASS.

2.2.9.1 Input -

Input to this routine includes the shared memory event flag clusters.

2.2.9.2 Process -

"IFINIT" initializes the operating environment for IFCASS. It associates the event flag clusters, determines the process ID, gets the history number, and activates a WAKEUP call. "IFINIT" also calls "IFWEAP" to initialize the Weapon Effects Table.

2.2.9.3 Output -

Output includes the initialized Weapon Effects Table.

2.2.10 SUBROUTINE IFL300 -

"IFL300" deals with Fire Mission items that are within 300 seconds of execution.

2.2.10.1 Input -

Input includes the address of the node that is to be executed.

2.2.10.2 Process -

"IFL300" determines whether target(s) are in range. If they are not, it issues an alert. In either case, "IFL300" marks the Fire Mission item as "active."

2.2.10.3 Output -

If applicable, output includes the five-minute out-of-range alerts.

2.2.11 SUBROUTINE IFLE30 -

"IFLE30" deals with Fire Mission items that are within 30 seconds of execution.

2.2.11.1 Input -

Input includes the address of the node that is to be executed.

2.2.11.2 Process -

"IFLE30" determines whether target(s) are in range. If so, it (1) performs a casualty recommendation against them, and (2) marks the Fire Mission item "active."

2.2.11.3 Output -

Output includes the casualty recommendations.

2.2.12 SUBROUTINE IFLE60 -

"IFLE60" deals with fire mission items that are within 60 seconds of execution.

2.2.12.1 Input -

Input includes the address of the node that is to be executed.

2.2.12.2 Process -

"IFLE60" determines whether target(s) are in range. If not, it issues an alert. In either case, "IFLE60" marks the fire mission item as "active."

2.2.12.3 Output -

Output includes the out-of-range alerts.

2.2.13 SUBROUTINE IFLKUP -

"IFLKUP" provides indices into the Weapon Effects Table.

2.2.13.1 Input -

Input includes (1) the fire mission item's location in the Fire Mission Table, and (2) the distance from firing unit to target.

2.2.13.2 Process -

"IFLKUP" will provide the first 4 coordinates of the cells which contain the casualty percentages for the six player types.

2.2.13.3 Output -

Output includes first four cordinates of the appropriate cells in the Weapon Effects Table.

2.2.14 SUBROUTINE IFPROC -

"IFPROC" assesses casualties of indirect fire.

2.2.14.1 Input -

Input includes information from the Weapon Effects Table, the Fire Mission Table ,the Target Group Table, and the Preplanned Target Table.

2.2.14.2 Process -

A casualty recommendation is produced based on the range of target, the maximum range of weapon, and other considerations. In addition, "IFPROC" (1) alters the status of items in the Fire Mission Table, (2) produces range alert messages based on the time of execution of a Fire Mission and the range of the target, and (3) puts targets into the Nearest Target Table.

2.2.14.3 Output -

Output includes the IFCAS casualty message, the range alerts, and the entries in the Nearest Target Table.

2.2.15 SUBROUTINE IFQIDH -

"IFQIDH" queues messages to the Interactive Display Component Message Handler (IDCHAN).

2.2.15.1 Input -

Input includes the message buffer and the message type.

2.2.15.2 Process -

"IFQIDH" determines the length of message. It then allocates space in the queue and queues the item to IDCHAN.

2.2.15.3 Output -

Output includes the message which is queued to IDCHAN.

2.2.16 SUBROUTINE IFRECO -

"IFRECO" generates an IFCASS casualty message.

2.2.16.1 Input -

Input includes both the Fire Mission pointer and the target's coordinates.

2.2.16.2 Process -

"IFRECO" determines the effect that a weapon has on players within 150 meters of a shell impact point. This routine also decrements the "not-executed" counter and increments the "executed" counter as appropriate.

2.2.17 INTEGER*4 FUNCTION IFTYPE -

"IFTYPE" determines the player type which, then, is used as an index into the Weapon Effects Table.

2.2.17.1 Input -

Input includes the player's index into the Player Status Vector Table.

2.2.17.2 Process -

After finding the player's type, "IFTYPE" determines its category for casualty calculations (person standing, person prone, wheeled vehicle, armored personnel carrier, or tank). For certain player types, the category is dependent upon the number of rounds used against the target.

2.2.17.3 Output -

Output includes the category code.

2.2.18 SUBROUTINE IFWEAP -

"IFWEAP" is the initialization routine for the IFCASS Weapon Table.

2.2.18.1 Input -

There are no inputs to this routine.

2.2.18.2 Process -

"IFWEAP" builds the casualty look-up array.

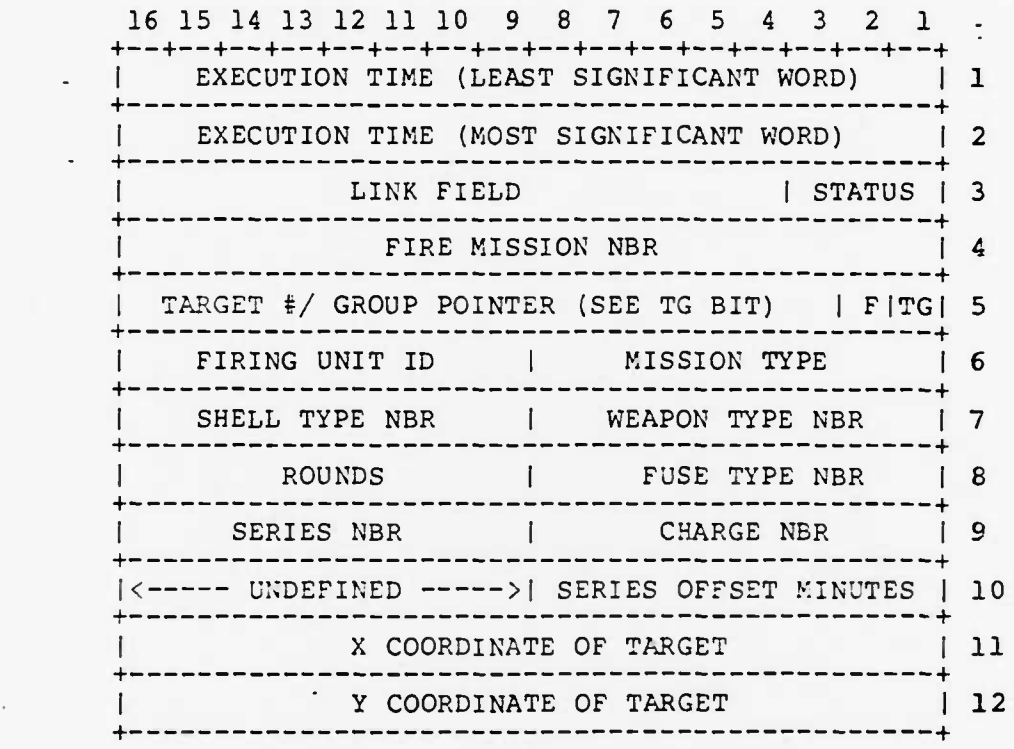
2.2.18.3 Output -

Output includes the completed look-up array.

ATTACHMENT A

IFCAS DATA STRUCTURES

--- IFCAS Fire Mission Table Item Format:

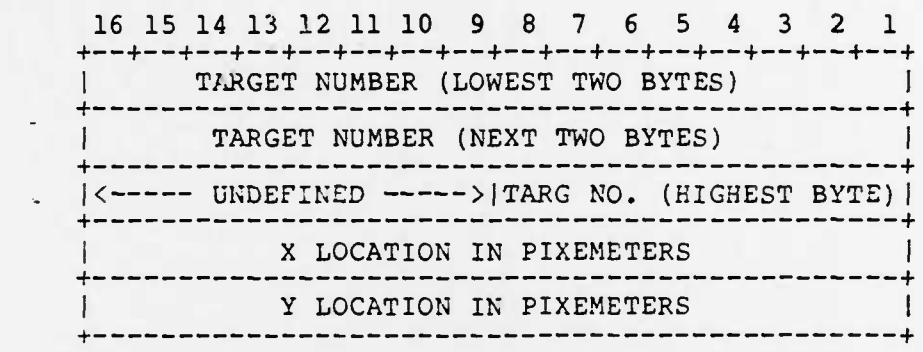


---- IFCAS Fire Mission Table Fields

FIELD	VALUES
Status	0 => Free 1 => Active 2 => Executed 3 => Illumination 4 => Out of Range 5 => Timed Out
Fire Mission Number	1-32767
Target Type	0 => Target 1 => Group
Force Indicator	0 => BLUEFOR 1 => OPFOR
Fire Mission Type	1 => Scheduled 2 => On Call 3 => Immediate
Firing Unit ID	1-75
Weapon Type	For BLUEFOR: 1 => 105mm 2 => 107mm 3 => 155mm 4 => 175mm 5 => 8" For OPFOR: 1 => 122mm Howitzer 2 => 152mm Howitzer 3 => 152mm Gun/Howitzer
Shell Type	1 => HE (Default) 2 => HERAP 3 => HC 4 => ILLUM 5 => WP 6 => ICM 7 => DPICM 8 => FASCAM 9 => CLGP
Fuse Type	1 => PD (Default) 2 => Delay

	3 => VT
Rounds	1 => BTRY 1 2 => BTRY 2 3 => BTRY 3 4 => BTRY 4 5 => BTYR 5 6 => BTRY 6 7 => BTRY 7 8 => BTRY 8 9 => BTRY 9 10 => BTRY 10 11 => BN 1 12 => BN 2 13 => BN 3 14 => BN 4 15 => BN 5 16 => BN 6 17 => BN 7 18 => BN 8 19 => BN 9 20 => BN 10
Charge	1 => Charge 7 (Default) 2 => Charge 8
Series Number	0 => Time is used 1 => H1 2 => H2 3 => H3 4 => H4 5 => H5 6 => H6 7 => H7 8 => H8 9 => H9 10 => H10
Series Offset	-59 .LE. Offset .LE. +59
Time	=0 => Offset is Used >0 => Seconds since 1-1-80
Target Number	AA000-ZZ999
Target X Coordinate	Non-negative integer (unit = pixemeters)
Target Y Coordinate	Non-negative integer (unit = pixemeters)

--- IFCAS Pre-planned Target Table Item Format:

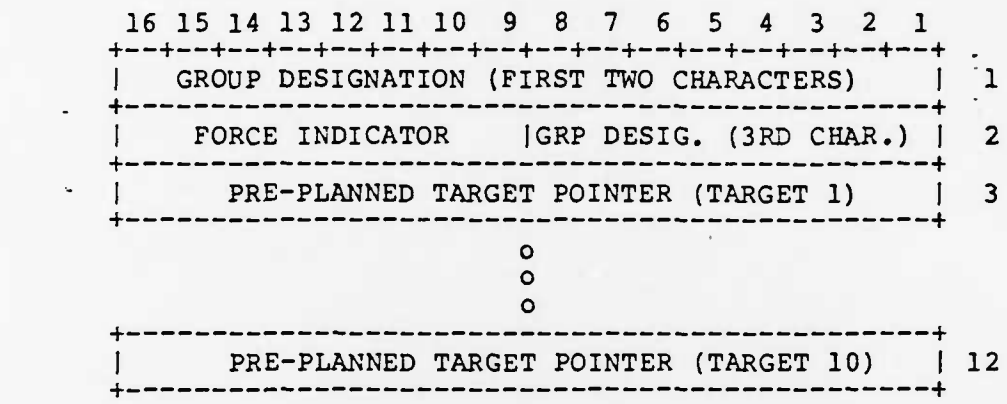


NOTE: Data Base contains distinct tables organized by force.

---- Pre-Planned Target Table Fields

Field	Values
Target Number	AA000-ZZ999
Target X Coordinate	Non-negative integer (unit = pixemeters)
Target Y Coordinate	Non-negative integer (unit = pixemeters)

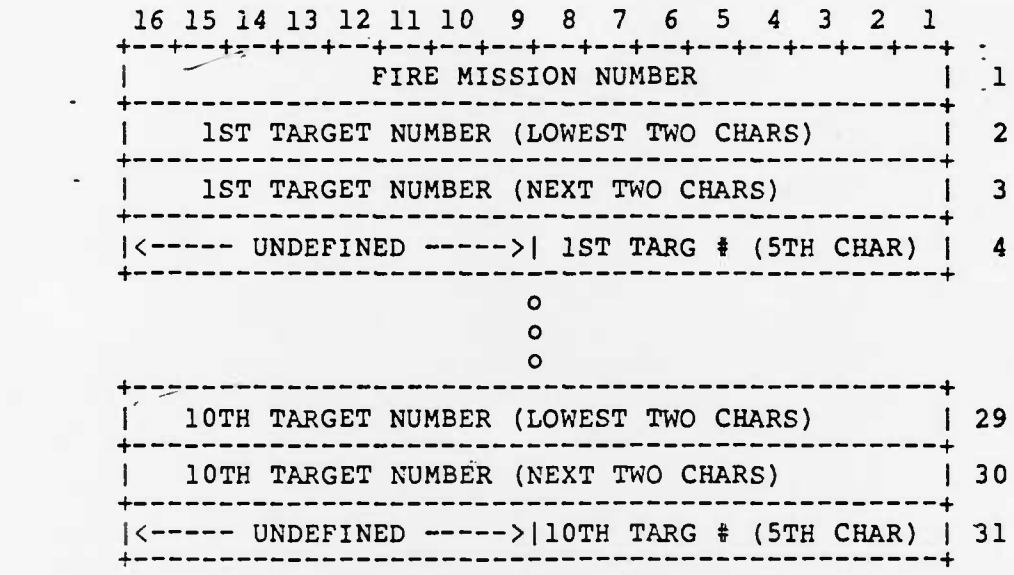
--- IFCAS Target Group Table Item Format:



---- IFCAS Target Group Table Fields

FIELD	VALUES
Target Group Designator	Alphanumeric
Force Indicator	0 => BLUEFOR 1 => OPFOR

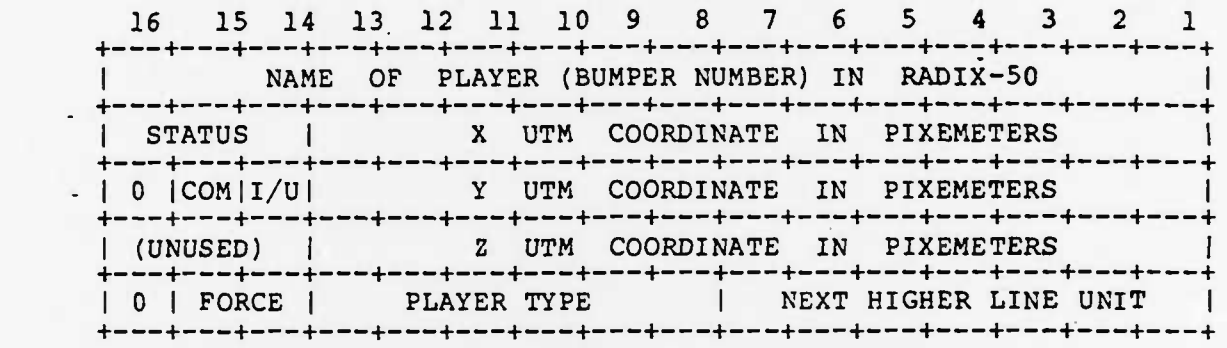
--- IFCAS Nearest Target Table Item Format:



---- IFCAS Nearest Target Table Fields

FIELD	VALUES
Fire Mission Number	1-32767
Target Number	AA0000-ZZ999

--- Player Status Vector Table Item Format (Players):

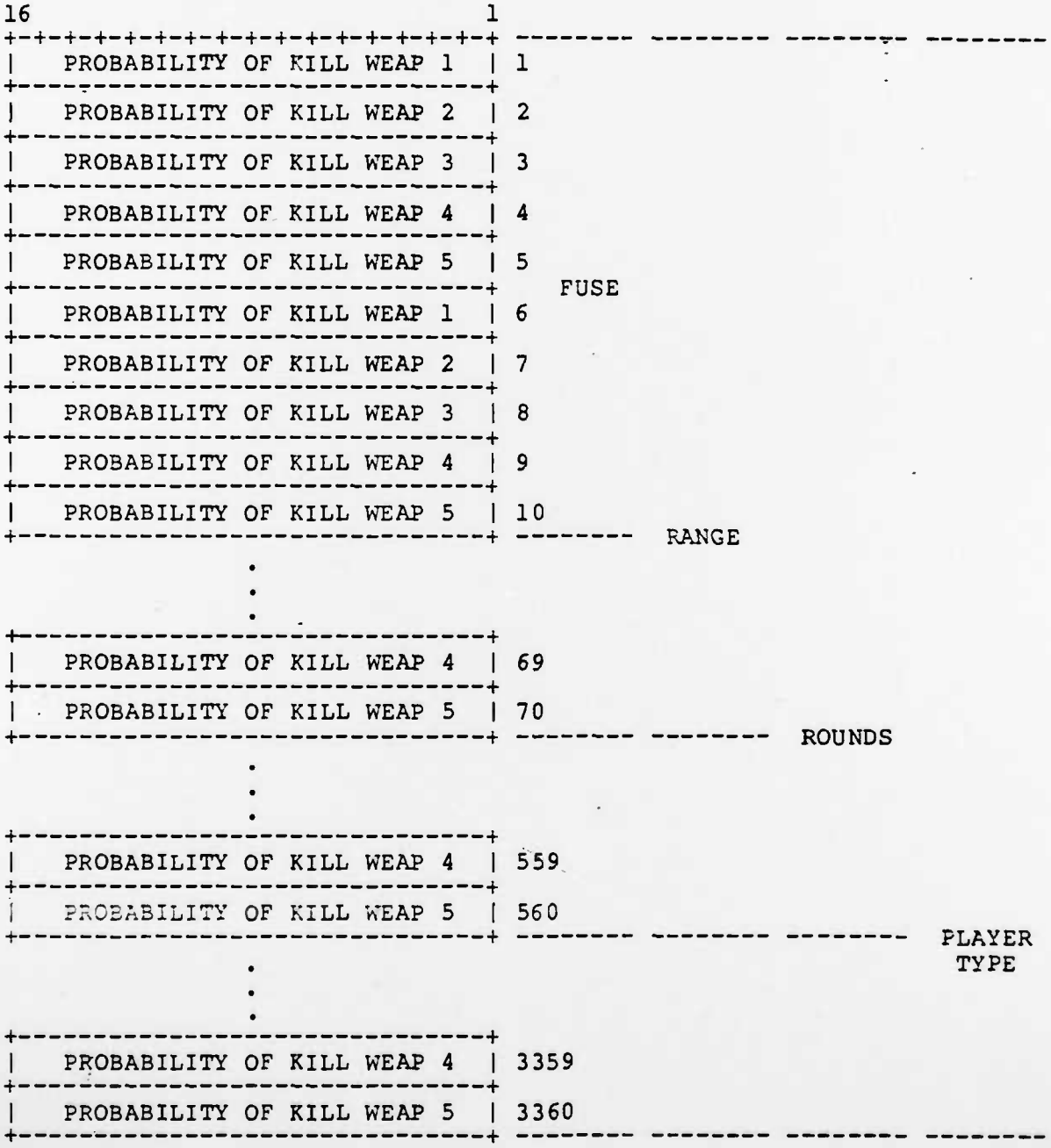


---- Player Status Vector Table Fields

FIELD	VALUES
Player Name	3 characters, radix 50
Status	0 => Not Used 1 => Operational 2 => Combat Loss 3 => Non-Combat Loss 4 => Unallocated Controller Kill 5 => Admin Kill 6 => Mechanically Down
I/U	0 => Uninstrumented 1 => Instrumented
Center of Mass	0 => Not included 1 => Included
Player Type	If White: 0 => Field Video 1 => Field Controller 2 => Fire Marker If RED Ground Player: 0 => Undefined 1 => tank (T-72) 2 => BMP 3 => BMP w/ PKT (73MM) 4 => BMP w/ SAGGER 5 => BRDM 6 => BRDM w/ SAGGER 7 => ZSU-23-4 8 => 122 mm SP Howitzer 9 => 155 mm Gun Howitzer 10 => 152 mm Howitzer 11 => Manpack 12 => Manpack w/ SAGGER 13 => Manpack w/ AK (M-16) 14 => Manpack w/ PKT (M-60) 15 => Manpack w/ SA7 (Stinger) 16 => Jammers 17 => Collectors 18 => Truck 19 => ADA - Uninstrumented 20 => SA9 - Uninstrumented 21 => 120 mm Mortar 22 => 180 mm Mortar 23 => Helicopter 24 => Fighter 25 => Bomber

	26 => Fighter/Bomber 27 => Reconnaissance If BLUE Ground Player: 0 => Undefined 1 => tank 2 => APC w/ COAX 3 => APC w/ TOW 4 => Manpack 5 => Manpack w/ Viper 6 => Manpack w/ Dragon 7 => Manpack w/ M-16 8 => Manpack w/ M-60 9 => REDEYE (Stinger) 10 => Vulcan 11 => GSR 12 => Jammers 13 => Collectors 14 => Truck 15 => ADA 16 => 107 mm Mortar 17 => 81 mm Mortar 18 => 175" SP Gun Howitzer 19 => 8" SP Howitzer 20 => 105 mm SP Howitzer 21 => 155 mm SP Howitzer 22 => Helicopter 23 => Fighter 24 => Bomber 25 => Fighter/Bomber 26 => Reconnaissance
Force Designator	0 => Blue 1 => Red 2 => White

--- Weapon Effects Table Item Format:



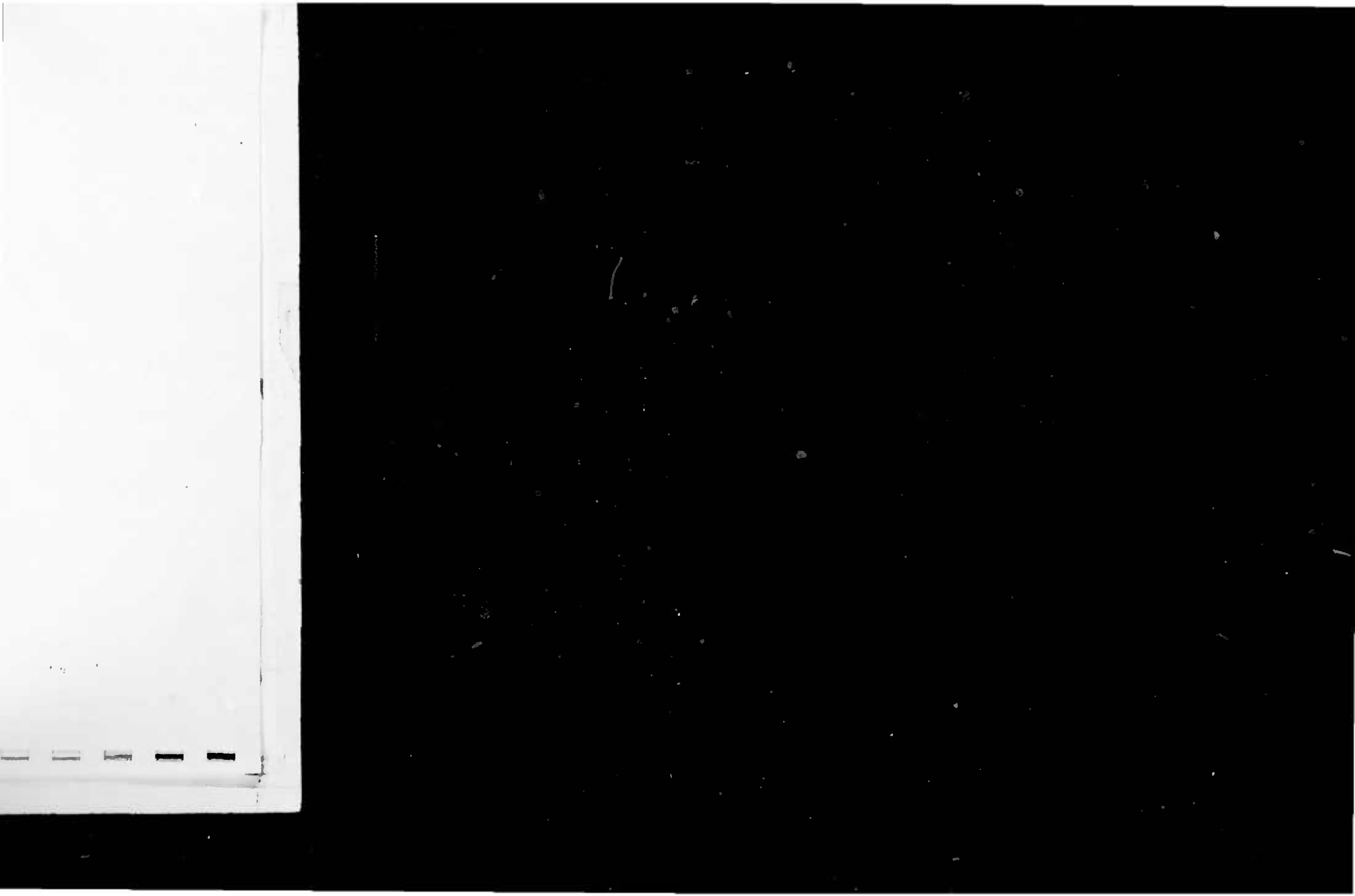
--- Target Engagement Vector Table Item Format:

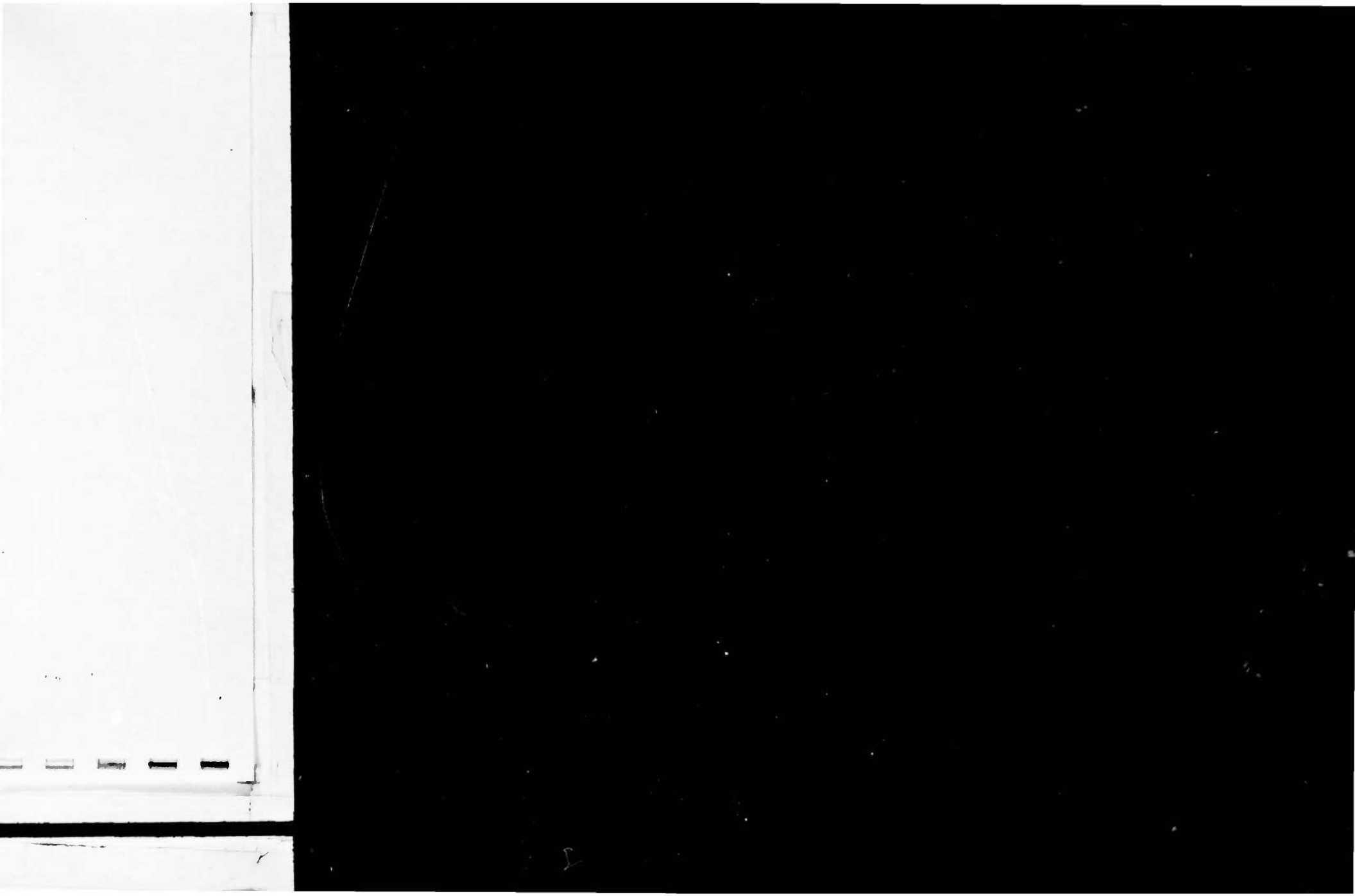
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
TARGET NUMBER CHARACTERS 1-3 (RAD50)																1
TARGET NUMBER CHARACTERS 2-6 (RAD50)																2
FIRER X UTM COORDINATE IN PIXEMETERS													SHL	WEP	FOR	3
FIRER Y UTM COORDINATE IN PIXEMETERS														-0-		4
TARGET X UTM COORDINATE IN PIXEMETERS														-0-		5
TARGET Y UTM COORDINATE IN PIXEMETERS														-0-		6

---- Target Engagement Vector Table Fields

FIELD	VALUES
Target Number	AA000-ZZ999
Force	0 => BLUEFOR 1 => OPFOR
Weapon	0 => Not Mortar 1 => Mortar
Shell	0 => Not Smoke 1 => Smoke


DAT
FILM



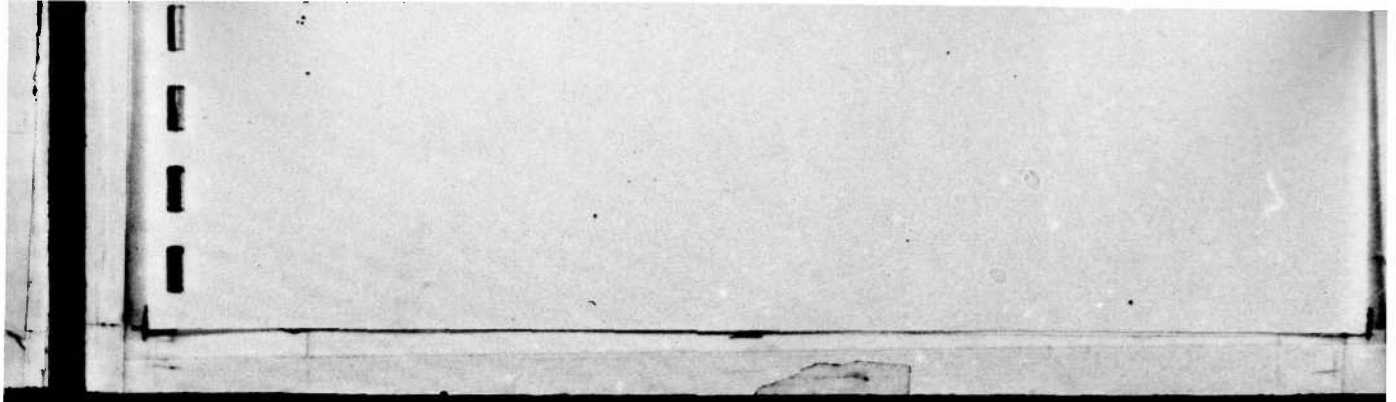


[redacted]

[redacted]

[redacted]

16 => Jammers
17 => Collectors
18 => Truck
19 => ADA - Uninstrumented
20 => SA9 - Uninstrumented
21 => 120 mm Mortar
22 => 180 mm Mortar
23 => Helicopter
24 => Fighter
25 => Bomber



PROBABILITY OF KILL WEAP 5	3360			

[redacted]